ABSTRACT OF THE DISCLOSURE

This invention relates generally to methods and compositions for direct detection of specific nucleic acid flanking sequences associated with structural chromosomal aberration breakpoints, by forming hybrids between the sequences and genetic probes, and detecting the probes. In particular aspects, the invention concerns detection of nucleic acid sequences *in situ* in chromosomes, and more specifically in cells, including interphase cells. Compositions of probes useful for detecting chromosomal translocations, in particular those associated with human leukemias, are also disclosed. An aspect of the invention is labelled probes that, when juxtaposed by formation of an aberration, are distinguishable and provide a pattern different from that of normal cells.

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